

## Section II (Amendments to the Claims)

Please cancel claims 3, 9-11, 13-14, 21-22, 28, 30-31, 37, 40-41, 53, 57-59, 70-72, 74-75 and 78-79, and amend claims 1-2, 4-5, 7-8, 16, 18-19, 23-24, 29, 32-36, 38, 42-43, 47-52, 54-55, 60-62, 67, 73, 76, and 80-84, as set out in the following listing of the claims 1-84 of the application.

1. **(Currently amended)** An apparatus for storing and dispensing gas, wherein gas is stored, comprising a gaseous hydride ~~sorbate-gas~~ that is decomposable to produce hydrogen gas and a solid decomposition product, and wherein the ~~sorbate-gas~~ gaseous hydride undergoes decomposition to form hydrogen gas for dispensing, said apparatus comprising:
  - (a) a storage and dispensing vessel for containing the gaseous hydride ~~sorbate-gas~~ in a physically adsorbed state; and
  - (b) a decomposition chamber, said decomposition chamber comprising a decomposition portion and a collection portion, wherein the storage and dispensing vessel is communicatively connected to the decomposition portion, and wherein the decomposition portion and the collection portion are separated by a hydrogen gas permeable membrane, wherein the decomposition portion contains a phosphoric acid-doped carbon adsorbent effective to decompose said gaseous hydride to produce hydrogen gas for dispensing, and a solid decomposition product.
  
2. **(Currently amended)** The apparatus of claim 1, wherein the storage and dispensing vessel comprises:
  - (a) a vessel constructed and arranged for holding a solid-phase physical sorbent medium, and for selectively flowing gas gaseous hydride into and out of said vessel;
  - (b) a solid-phase physical sorbent medium disposed in said vessel at an interior gas pressure;
  - (c) a ~~sorbate-gas~~ gaseous hydride physically adsorbed on said solid-phase physical sorbent medium; and
  - (d) a dispensing assembly coupled in gas flow communication with the vessel;

wherein at least a portion of the ~~sorbate gas~~ gaseous hydride desorbs from the solid-phase physical sorbent medium under dispensing conditions to yield desorbed ~~sorbate gas~~ gaseous hydride for flow of said desorbed ~~sorbate gas~~ gaseous hydride through the dispensing assembly.

3. (Cancelled)
4. (Currently amended) The apparatus of claim [[3]] 1, wherein the gaseous hydride comprises a hydride selected from the group consisting of silane, germane, stibine and diborane.
5. (Currently amended) The apparatus of claim [[3]] 1, wherein the gaseous hydride comprises silane.
6. (Original) The apparatus of claim 2, wherein the solid-phase physical sorbent medium disposed in said vessel comprises a material selected from the group consisting of silica, carbon molecular sieves, alumina, macroreticulate polymers, kieselguhr, carbon, and aluminosilicates.
7. (Currently amended) The apparatus of claim 1, wherein the hydrogen gas permeable membrane is selective for hydrogen over the ~~sorbate gas~~ gaseous hydride.
8. (Currently amended) The apparatus of claim 1, wherein the hydrogen gas permeable membrane comprises perfluorosulfonic acid.
9. (Cancelled)
10. (Cancelled)
11. (Cancelled)

12. **(Original)** The apparatus of claim 1, further comprising a fuel cell communicatively connected to the collection portion of the decomposition chamber, wherein the fuel cell is positioned downstream of the collection portion of the decomposition chamber.
13. **(Cancelled)**
14. **(Cancelled)**
15. **(Original)** The apparatus of claim 2, wherein the dispensing assembly comprises at least one gas regulator positioned between the storage and dispensing vessel and the decomposition chamber.
16. **(Currently amended)** The apparatus of claim [[2]] 1, wherein the dispensing assembly comprises at least one gas regulator disposed within the vessel.
17. **(Original)** The apparatus of claim 2, wherein the interior gas pressure is subatmospheric.
18. **(Currently amended)** The apparatus of claim 2, wherein the interior gas pressure is ~~atmospheric~~ super atmospheric.
19. **(Currently amended)** The apparatus of claim 2, further comprising a heater operatively arranged in relation to the vessel for selective heating of the solid-phase physical sorbent medium, to effect thermally-enhanced desorption of at least a portion of the ~~sorbate gas~~ gaseous hydride from the solid-phase physical sorbent medium.
20. **(Original)** The apparatus of claim 2, wherein the vessel is constructed and arranged to effect desorption of at least a portion of said sorbate gas from the solid-phase physical sorbent medium under dispensing conditions including a pressure exterior of said vessel below said interior pressure.
21. **(Cancelled)**

22. (Cancelled)
23. (Currently amended) The apparatus of claim 1, wherein the ~~serbate gas~~ gaseous hydride decomposes at room temperature.
24. (Currently amended) The apparatus of claim [[3]] 1, wherein the gaseous hydride generates hydrogen gas and metal upon decomposition.
25. (Original) The apparatus of claim 24, wherein the metal comprises a species selected from the group consisting of silicon, germanium, boron and antimony.
26. (Original) The apparatus of claim 24, wherein the metal is at least partially regeneratable to the gaseous hydride.
27. (Original) The apparatus of claim 1, further comprising a hydrogen-containing source communicatively connected to the collection portion of the decomposition chamber.
28. (Cancelled)
29. (Withdrawn-currently amended) The apparatus of claim [[28]] 27, wherein the hydrogen-containing source supplies hydrogen to the decomposition chamber to re-hydride at least a portion of the metal contained therein.
30. (Cancelled)
31. (Cancelled)
32. (Withdrawn-currently amended) The apparatus of claim [[31]] 27, wherein the gaseous hydride comprises a species selected from the group consisting of silane, germane, stibine and diborane.

33. **(Withdrawn-currently amended)** The apparatus of claim ~~[[28]]~~ 27, wherein the hydrogen gas permeable membrane is selective for hydrogen over the sorbate gas.
34. **(Withdrawn-currently amended)** The apparatus of claim ~~[[28]]~~ 27, wherein the hydrogen gas permeable membrane comprises perfluorosulfonic acid.
35. **(Withdrawn-currently amended)** The apparatus of claim ~~[[28]]~~ 27, wherein the ~~sorbate gas~~ gaseous hydride decomposes at room temperature.
36. **(Withdrawn-currently amended)** ~~An~~ The apparatus of claim 1, comprising for storing and dispensing a sorbate gas, said apparatus comprising a storage and dispensing vessel containing the sorbate gas, said storage and dispensing vessel comprising:
- ~~(a) a vessel constructed and arranged for holding a solid phase physical sorbent medium;~~
  - ~~(b) a solid phase physical sorbent medium disposed in said vessel at an interior gas pressure;~~
  - ~~(c) a sorbate gas physically adsorbed on said solid phase physical sorbent medium; and~~
  - ~~(d) a dispensing assembly coupled in gas flow communication with the~~ storage and dispensing vessel and selectively actuatable for gas dispensing, wherein the dispensing assembly comprises ~~[[a]]~~ the hydrogen gas permeable membrane ~~within the vessel,~~
- ~~wherein at least a portion of the sorbate gas undergoes decomposition in the vessel to form hydrogen gas, and hydrogen gas egresses the vessel through the gas permeable membrane of the dispensing assembly during said gas dispensing.~~
37. **(Cancelled)**
38. **(Withdrawn-currently amended)** The apparatus of claim ~~[[37]]~~ 36, wherein the gaseous hydride comprises a species selected from the group consisting of silane, germane, stibine and diborane.

39. **(Withdrawn)** The apparatus of claim 36, wherein the solid-phase physical sorbent medium disposed in said vessel comprises a material selected from the group consisting of silica, carbon molecular sieves, alumina, macroreticulate polymers, kieselguhr, carbon, and aluminosilicates.
40. **(Cancelled)**
41. **(Cancelled)**
42. **(Withdrawn-currently amended)** The apparatus of claim 36, wherein the hydrogen gas permeable membrane is selective for hydrogen over the ~~sorbate gas~~ gaseous hydride.
43. **(Withdrawn-currently amended)** The apparatus of claim 36, wherein the hydrogen gas permeable membrane comprises perfluorosulfonic acid.
44. **(Withdrawn)** The apparatus of claim 36, further comprising a fuel cell communicatively connected downstream of the storage and dispensing vessel.
45. **(Withdrawn)** The apparatus of claim 36, wherein the dispensing assembly comprises at least one gas regulator disposed within the vessel.
46. **(Withdrawn)** The apparatus of claim 36, wherein the interior gas pressure is subatmospheric.
47. **(Withdrawn-currently amended)** The apparatus of claim 36, wherein the interior gas pressure is ~~atmospheric~~ super atmospheric.
48. **(Withdrawn-currently amended)** The apparatus of claim 36, wherein the vessel is constructed and arranged to effect desorption of at least a portion of said ~~sorbate gas~~ gaseous hydride from the solid-phase physical sorbent medium under dispensing conditions including a pressure exterior of said vessel below said interior pressure.

49. **(Withdrawn-currently amended)** The apparatus of claim 36, wherein the ~~sorbate-gas~~ gaseous hydride decomposes at room temperature.
50. **(Withdrawn-currently amended)** A method for generating hydrogen gas by the decomposition of a ~~sorbate-gas~~ gaseous hydride, said method comprising:
- (a) providing an apparatus according to claim 1, wherein said gaseous hydride is adsorbed on a solid-phase physical sorbent medium;
  - ~~(a)~~ (b) desorbing at least a portion of said ~~sorbate-gas~~ gaseous hydride from [[a]] the solid-phase physical sorbent medium disposed in a storage and dispensing vessel, said storage and dispensing vessel comprising a solid phase physical sorbent medium having a physically sorptive affinity for said sorbate gas disposed therein;
  - ~~(b)~~ (c) flowing the ~~sorbate-gas~~ gaseous hydride from the storage and dispensing vessel to [[a]] the decomposition chamber; and
  - ~~(c)~~ (d) decomposing the ~~sorbate-gas~~ gaseous hydride in the decomposition chamber to generate hydrogen gas.
51. **(Withdrawn-currently amended)** The method of claim 50, wherein the ~~sorbate-gas~~ gaseous hydride is desorbed from the solid-phase physical sorbent medium by reduced pressure desorption.
52. **(Withdrawn-currently amended)** The method of claim 50, wherein the ~~sorbate-gas~~ gaseous hydride is desorbed from the solid-phase physical sorbent medium by thermally-enhanced desorption.
53. **(Cancelled)**
54. **(Withdrawn-currently amended)** The method of claim ~~[[53]]~~ 50, wherein the gaseous hydride comprises a species selected from the group consisting of silane, germane, stibine and diborane.

55. **(Withdrawn-currently amended)** The method of claim [[53]] 50, wherein the gaseous hydride comprises silane.
56. **(Withdrawn)** The method of claim 50, wherein the solid-phase physical sorbent medium comprises a material selected from the group consisting of silica, carbon molecular sieves, alumina, macroreticulate polymers, kieselguhr, carbon, and aluminosilicates.
57. **(Cancelled)**
58. **(Cancelled)**
59. **(Cancelled)**
60. **(Withdrawn-currently amended)** The method of claim [[59]] 50, wherein the hydrogen gas permeable membrane is selective for hydrogen over the ~~sorbate gas~~ gaseous hydride.
61. **(Withdrawn-currently amended)** The method of claim [[59]] 50, wherein the gas permeable membrane comprises perfluorosulfonic acid.
62. **(Withdrawn-currently amended)** The method of claim [[59]] 50, further comprising flowing the hydrogen gas into a fuel cell that is communicatively connected to the collection portion of the decomposition chamber.
63. **(Withdrawn)** The method of claim 50, wherein the storage and dispensing vessel comprises a dispensing assembly.
64. **(Withdrawn)** The method of claim 63, wherein the dispensing assembly comprises at least one gas regulator positioned between the storage and dispensing vessel and the decomposition chamber.
65. **(Withdrawn)** The method of claim 63, wherein the dispensing assembly comprises at least one gas regulator disposed within the storage and dispensing vessel.



66. **(Withdrawn)** The method of claim 50, wherein the sorbate gas decomposes at room temperature.
67. **(Withdrawn-currently amended)** The method of claim ~~[[53]]~~ 50, wherein the gaseous hydride generates hydrogen gas and metal upon decomposition.
68. **(Withdrawn)** The method of claim 67, further comprising regenerating the metal by introducing hydrogen from a hydrogen-containing source to the decomposition chamber to re-hydride the metal.
69. **(Withdrawn)** The method of claim 50, further comprising flowing the hydrogen gas to a fuel cell.
70. **(Cancelled)**
71. **(Cancelled)**
72. **(Cancelled)**
73. **(Withdrawn-currently amended)** A method for generating hydrogen gas by the decomposition of a ~~sorbate gas~~ gaseous hydride, for consumption, said method comprising:
- (a) providing an apparatus according to claim 1, with a solid-phase physical sorbent medium disposed in the storage and dispensing vessel;
  - ~~(a)~~ (b) physically adsorbing a gaseous hydride on said sorbate gas into a solid-phase physical sorbent medium having sorptive affinity for said sorbate gas, wherein the solid phase physical sorbent medium is disposed in a storage and dispensing vessel comprising a dispensing assembly;
  - (c) desorbing gaseous hydride from said solid-phase physical sorbent medium and passing the gaseous hydride to the decomposition portion of the decomposition chamber;

- (b) ~~(d)~~ decomposing at least a portion of said gaseous hydride sorbate gas ~~physically adsorbed into the solid phase physical sorbent medium~~ to form hydrogen gas; and
- (c) ~~(e)~~ flowing the hydrogen gas from the collection portion of the decomposition chamber storage and dispensing vessel to a hydrogen gas consuming unit.
74. (Cancelled)
75. (Cancelled)
76. (Withdrawn-currently amended) The method of claim [[75]] 73, wherein the gaseous hydride comprises a species selected from the group consisting of silane, germane, stibine and diborane.
77. (Withdrawn) The method of claim 73, wherein the solid-phase physical sorbent medium disposed in said vessel comprises a material selected from the group consisting of silica, carbon molecular sieves, alumina, macroporous polymers, kieselguhr, carbon, and aluminosilicates.
78. (Cancelled)
79. (Cancelled)
80. (Withdrawn-currently amended) The method of claim [[74]] 73, wherein the gas permeable membrane is selective for hydrogen gas over the sorbate gas.
81. (Withdrawn-currently amended) The method of claim [[74]] 73, wherein the gas permeable membrane comprises perfluorosulfonic acid.
82. (Withdrawn-currently amended) The method of claim [[74]] 73, wherein the hydrogen gas consuming unit comprises a fuel cell.

83. **(Withdrawn-currently amended)** The ~~apparatus~~ method of claim ~~[[74]]~~ 73, wherein the sorbate gas decomposes at room temperature.
84. **(Withdrawn-currently amended)** ~~An~~ The apparatus according to claim 1, wherein ~~for generating hydrogen gas, comprising:~~
- ~~a vessel arranged to contain a sorbate gas in a physically adsorbed state, said sorbate gas being decomposable to form hydrogen gas;~~
  - ~~[[a]] the decomposition chamber is locus in the storage and dispensing vessel or in a chamber is communicatively connected to the storage and dispensing vessel, wherein the sorbate gas decomposes to form hydrogen gas; and~~
  - ~~a gas permeable membrane arranged to separate the hydrogen gas.~~